Nematology Circular No. 16
May 1976

Fla. Dept. of Agr. & Consumer Serv.
Division of Plant Industry

LYCHEE TREE DECLINE CAUSED BY NEMATODES IN SOUTH AFRICA

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A considerable amount of dieback and decline was observed in 1969 in older lychee trees, Litchi chinensis Sonn., in Natal, a province of the Republic of South Africa. In some orchards 40 per cent of the trees had already died and another 35 per cent of the trees were in decline, not only in Natal, but also in Eastern Transvaal, Republic of South Africa.

SURVEY

A survey in South Africa of lychee orchards in varying states of decline established in many instances the presence of Xiphinema brevicolle Lordello & de Costa, 1961, (a dagger nematode) and Hemicriconemoides mangiferae Siddiqi, 1961. Wherever decline symptoms were seen, particularly in trees over 15 years old, large populations of one or both nematodes were present. As many as 20,000 H. mangiferae were recovered from 1/2 liter of mixed soil and roots and up to 10,000 X. brevicolle were recovered from the same volume of soil and roots. There were strong positive relationships between the number of nematodes present and the state of decline of the living tree.

The use of soil from below existing trees for air-layering is a common practice both here and in many other parts of the world. This leads to many nematode-infected plants that are used in orchards. Plants propagated in this manner largely account for the widespread decline.

SYMPTOMS

Old trees, in particular, exhibit symptoms of decline, which are typified by the presence of many bare twigs and branches, leaf chlorosis and leaf-tip burn, poor flowering, excessive fruit-drop, and erratic leaf flushes. Replanted trees do poorly in infested areas and are slow to become established.

Lychee roots attacked by H. mangiferae develop adventitious roots and sometimes have a "stubby-root" appearance (fig. 1). H. mangiferae commonly penetrates deep into root tissue and is often found totally embedded within its root cortex (fig. 2). Mass invasion by this nematode results in rupture of the epidermis and collapse of the exodermis and cortical parenchyma. Other species of this genus do not generally feed as endoparasites. X. brevicolle has been observed partially embedded in root tissue feeding on cortical cells where disruption of the cells was apparent.

GEOGRAPHIC DISTRIBUTION AND HOST RANGE

Hemicriconemoides mangiferae is known to occur in Sudan, Australia, Egypt, India, Pakistan, Thailand and Republic of South Africa (Natal and Eastern Transvaal). Host-crops of this nematode include Mangifera indica L. (mango), Ananas comosus (L.) Merr. (pineapple), Achras zapota L. (sapodilla), Citrus paradisi Macf. (grapefruit), Piper nigrum L. (pepper), and Litchi chinensis Sonn. (lychee).

Contribution No. N-148, Bureau of Nematology

The known geographic distribution of Xiphinema brevicolle includes Brazil, Czechoslovakia, France, French West Indies, Guadeloupe, India, Israel, Poland, Portugal, Natal, Eastern Transvaal, and the United States (California). Reported hosts of this nematode include Vitis sp. (grape), Berberis sp. (barberry), Citrus sp., Fragaria sp. (strawberry), Persea americana Mill. (avocado), Coffea arabica L. (coffee), and Litchi chinensis Sonn. (lychee).

CONTROL

Either telone or methyl bromide applied at tree sites have provided nematode control. Up to 34 per cent taller trees have been obtained where controls were applied.

REFERENCES:

Milne, D. L., E. A. De Villiers, and L. C. Holtzbausen. 1971. Litchi tree decline caused by nematodes. Phytophylactica 3:31-44.

Milne, D. L., M. R. Appleton, and L. C. Holtzbausen. 1975. The anatomical reaction of Litchi chinensis Sonn. roots attacked by three nematode species and a soil mite. Phytophylactica 7:15-20.

Milne, D. L. 1976. Personal Communication.

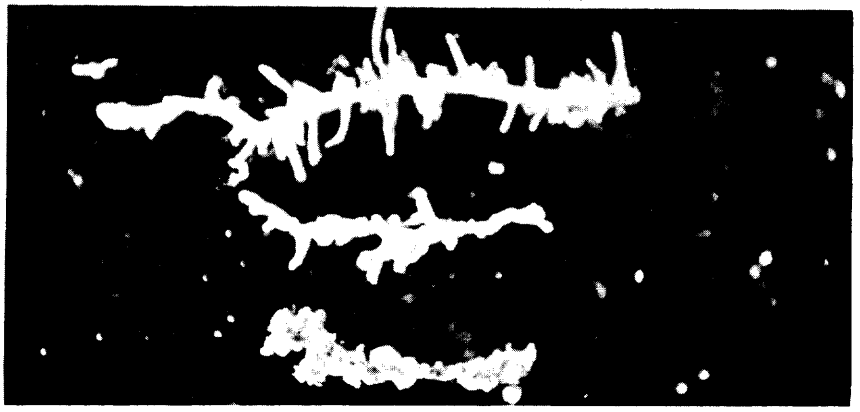

Fig. 1. Lychee roots. Healthy (top) compared with typical Hemicriconemoides mangiferae-infected stubby-root appearance.

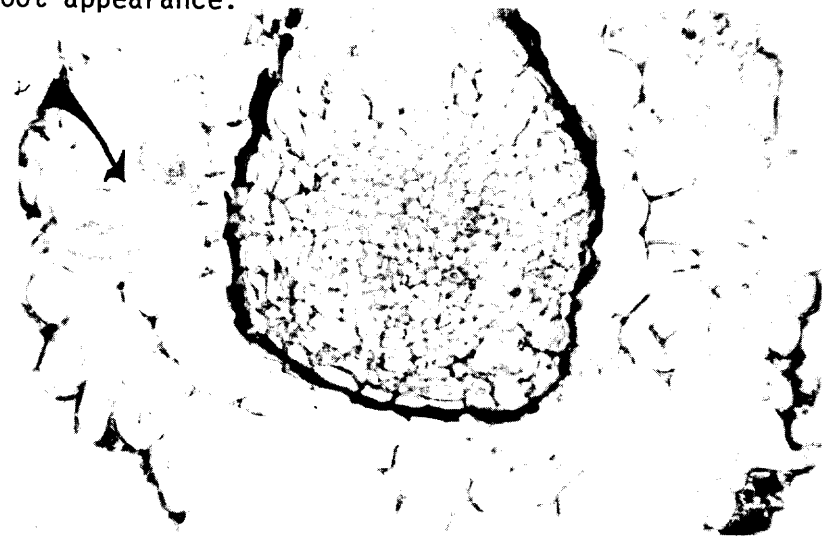

Fig. 2. Hemicriconemoides mangiferae (arrow) inside lychee root.